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10/589,331	08/14/2006	Hiroyuki Yoshida	2006_1311A	6522

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EXAMINER	
STELLING, LUCAS A	

ART UNIT	PAPER NUMBER
1776	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/589,331	YOSHIDA, HIROYUKI	
	Examiner	Art Unit	
	Lucas Stelling	1776	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10-21-10*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *3-8,24,25,27 and 28* is/are allowed.

6)☒ Claim(s) *1, 2, 9-23, 26, 29, and 30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 2, 10, 11, 26, 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,589,927 to Allen et al. ("Allen").

2. As to claim 1, Allen teaches a method of comprising:

continuously supplying material to be processed into a vertical reactor though an inlet provided for the reactor **(See col. 2 lines 5-35, material to be treated is supplied through inlet 7 of the reactor and is continuously supplied to provide a fluidization of the particles in the reactor; see col. 1 lines 5-10)**, whose interior is kept at a sub-critical condition for water **(See throughout conditions below critical conditions for water are contemplated in the reactor)**; and

continuously taking out a liquid containing decomposition products through any one of a plurality of outlets provided at a different position where from where the inlet of the reactor is provided **(See col. 2 lines 35-55; and col. 3 lines 10-25; the water is taken off through a side of the reactor and the offtake is then split and provides liquid to 20 and the separator 9; at least 19, 11, and 16, and 20 provide a plurality of outlets)**, to adjust residence time of the liquid containing the decomposition product

in the reactor **(See col. 3 lines 10-25; fluid recirculated through 20 is done to allow for longer residence time by allowing several passes through the reactor)**.

3. As to claim 2, Allen teaches a method comprising:

continuously supplying material to be processed into a vertical reactor through an inlet provided for the reactor**(See col. 2 lines 5-35, material to be treated is supplied through inlet 7 of the reactor and is continuously supplied to provide a fluidization of the particles in the reactor)**, whose interior is kept at a sub-critical condition for water**(See throughout conditions below critical conditions for water are contemplated in the reactor)**;

continuously taking out a liquid containing decomposition produces through any one of a plurality of outlets provided at a different position from a position where the inlet of the reactor is provided**(See col. 2 lines 35-55; and col. 3 lines 10-25; the water is taken off through a side of the reactor and the offtake is then split and provides liquid to 20 and the separator 9; at least 19, 11 and 16, and 20 provide a plurality of outlets)**, to form desired steady concentration profiles of the decomposition product in the reactor **(See col. 3 lines 15-25; taking off liquid and recirculating it facilitates multiple passes through the reactor and removal of products to thereby facilitate the creation of concentrations the desired products in the reactor)**;. and

taking out the desired decomposition product through at least one of the outlets, the at least one of the outlets being provided at a position where the concentration of the desired decomposition product is high**(See col. 2 lines 35-65; water drawn off from the side offtake is provided to separator 9 and then solids are provided to the**

secondary reactor 10, from which product is removed via 16. Therefore the product is within the water drawn off from the reactor. And since the product is in the stream drawn off, the concentration will be higher than near the bottom inlet of the unreacted starting materials).

4. As to claim 10, Allen contemplates that the reactant material comes from wastewater **(See Allen col. 5 lines 10-15).**

5. As to claim 11, Allen teaches an apparatus comprising:

a reactor **(1)**;

a heating means for heating a mixture **(18)**;

a compressing means for compressing the mixture **(15 is a pump; see also 6 and the unlabeled pump opposite 5)**;

introducing means for introducing the material **(4 and 15 together constitute an introducing means, which is a pressurized feeding apparatus)**;

an inlet **(7)**;

a plurality of outlets **(19 and the side offtake from the reactor)** for letting out a mixture of decomposition product and water from the reactor, wherein the outlets are provided at respective positions which are different from one another in a flow direction of the sub-critical water **(The flow direction is from the bottom of the reactor to the top vertically. The outlet 19 and the side offtake are provided at different vertical positions)**, and which are different from a position at which the inlet is provided **(The inlet is provided at the bottom most point of the reactor)**,

wherein the reactor is a vertical reactor in which liquid flows in only one vertical direction **(See in the Fig. and col. 2 lines 35-50; the water flows vertically upward)**.

6. As to claim 26, Allen contemplates that the reactant material comes from wastewater **(See Allen col. 5 lines 10-15).**

7. As to claims 29 and 30, in Allen the water flows vertically from the bottom to the top in the reactor **(See in the Fig. and see col. 2 lines 35-50)**.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 9 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allen in view of U.S. Patent No. 5,386,055 to Lee et al. (“Lee”).

11. As to claims 9 and 23, Allen teaches the method of claims 1 and 2, and Allen provides for chemical treatment of reactants using gas, and contemplates a wide variety of reactants including waste treatment **(See Allen col. 5 lines 1-20)**. But Allen does not

contemplate sub-critical water decomposition occurring at 130°C to 374°C, with an accompanying reaction pressure which is higher than the water vapor pressure at a given temperature. Lee is directed to a depolymerization process in which is carried out at subcritical temps between 200 and 374, and associated pressures **(See Lee col. 7 lines 30-40)**. It is acknowledged that Lee teaches that such subcritical temperatures are not preferred as they require larger residence times, however in view of the reaction process in Allen the flow is recirculated to provide a desired residence time in the reactor, and this will mitigate the residence time issue identified by Lee. Also, a person having ordinary skill in the art at the time of invention would have also recognized that the use of sub-critical temperatures would allow for decomposition at lower temperatures and pressures than supercritical processing. Therefore, it would have been obvious to a person having ordinary skill in the art at the time of invention to provide a temperature between 130 and 374, and associated pressures, in order to provide for elevated temperature subcritical processing of reactants, while still providing lower temperatures and pressures than supercritical processing.

12. Claims 12, 13, and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,322,665 to Chervenak et al ("Chervenak").

13. As to claim 12, Chervenak teaches an apparatus comprising:

a vertical reactor **(64 in Fig. 1, the fractionator is fully capable of performing the functions of a reactor)**,

a heating means **(60)**,

introducing means for introducing the material to be processed into the reactor **(58 through 60 in Fig. 1 is a pipe capable of introducing reactants into the column 64)**;

an outlet **(70, 68, and 66)**,

the reactor is arranged substantially vertically **(See 64 in Fig. 1)**,

the inlet is provided for at least one of a top end portion or bottom end portion **(See in Fig. 1, the inlet is provided at the bottom end portion)**, and

wherein the position of the outlet is adjustable **(See in Fig. 1, the position of the outlet can be at 70, 68, or 66)**.

Chervenak is different from claim 1 in that Chervenak does not clearly recite the use of a compressing means. However, Chervenak shows the use of a pump on the recirculating line **(See Pump P in line 74, and see col. 4 lines 65-68, the feed is pressurized in the line)**. A person having ordinary skill in the art at the time of invention would have known to provide a compressing means in order to pressurize the feed line to a desired pressure. Therefore, it would have been obvious to a person having ordinary skill in the art at the time of invention to provide a compression means in the apparatus of Chervenak in order to pressurize the feed line.

14. As to claim 13, Chervenak teaches the apparatus of claim 12, and further teaches that the outlet is formed as a plurality of positions on a side wall of the column **(See 72, 70, 68, and 66 on 64 in Fig. 1)**.

15. As to claim 16, Chervenak teaches the apparatus of claim 12, but does not mention whether the reactor is cylindrical, the inlet is circular, or whether the inlet had a

diameter in a range of 1/5 to 1/15 times the inner diameter of the vertical reactor. However, the selection of a cylindrical shape for the vertical reactor is an obvious selection of shape, which a person having ordinary skill in the art would recognize provides for constant stress around the circumference of the reactor. See MPEP 2144.04(IV)(B). As to a providing a circular inlet, this is also an obvious selection of shape, which a person would have found obvious on connecting a cylindrical supply pipe to the reactor. See again MPEP 2144.04(IV)(B). And providing that the inlet is in a range of 1/5 time to 1/15 times an inner diameter of the reactor is an obvious selection of relative dimensions, which is not patentably significant unless it is shown that the claimed relative dimensions cause the device to work differently in an unobvious way. See MPEP 2144.04(IV)(A).

16. As to claim 17, Chervenak teaches the apparatus of claim 12, but does not teach a plurality of the vertical-type column reactors. However, providing multiple vertical type reactors would have been an obvious duplication of parts which would allow for accommodating more incoming material, and provide redundancy. See also MPEP 2144.04(VI)(B), *mere duplication of parts has no patentable significance unless new and unexpected results are shown*.

17. As to claim 18, Chervenak teaches the apparatus of claim 12, and teaches a tubular reactor joined to the outlet of the vertical column **(See 24 in Fig 1, 36 is also shown)**.

18. As to claim 19, Chervenak teaches the apparatus of claim 18, and Chervenak provides another tubular reactor, making a plurality **(See 36 in Fig. 1)**.

19. As to claim 20, Chervenak teaches the apparatus of claim 18, and Chervenak provides for a heater **(18)**, and heat exchanger **(34)**, which control the temperature in the reactors **(See 18 on the inlet to 24 and 34 upstream of 36)**.

20. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chervenak in view of Geissbuehler.

21. As to claim 14, Chervenak teach the apparatus of claim 12, but provides multiple outlets for the removal of different products streams, and does not contemplate using using an adjustable height outlet. Geissbuehler teaches using an adjustable height outlet in a vertical column **(See Geissbeuhler abstract and col. 1 lines 54-58)**. Geissbuehler recognizes that an adjustable height outlet allows for adjusting the product discharge **(See Geissbuehler col. 3 lines 10-13)**. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to provide for an axially displaceable outlet in the reactor of Chervenak in order to adjust the product discharge from the column by moving the outlet.

22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chervenak in view of U.S. Patent No. 3,830,698 to Kleiss ("Kleiss").

23. As to claim 15, Chervenak teaches the apparatus of claim 12, but does not mention the use of monitoring means through which the interior of the column can be visualized. Kleiss teaches the use of multiple thermo sensor in a column **(See 0, 14, 16, and 17 in Fig. 1)**. Kleiss explains that the use of multiple sensors provides for

producing temperature gradient signals **(See col. 5 lines 1-10)**. A person having ordinary skill in the art at the time of invention would have had within their skill the ability to convert temperature gradient signals to a visualized representation for monitoring purposes, e.g., by output to a computer monitor. Therefore, it would have been obvious to a person having ordinary skill in the art at the time of invention to provide monitoring means, such as multiple temperature sensors in order to report a temperature gradient to a computer which is capable of being visualized.

24. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chervenak in view of U.S. Patent No. 3,675,434 to Crawford et al. ("Crawford").

25. As to claims 21 and 22, Chervenak teaches the apparatus of claim 12, but does not mention the use of a back-pressure valve and a cooling pipe immediately before the valve. Crawford teaches the use of column having multiple outlets **(See 56 in Fig. 1)**. Crawford provides for the use of a heat exchanger which cools the product **(See 109)** followed by a pressure reducing valve, which reduces the pressure of the product **(See 112)**. Crawford explains that the use of a heat exchanger followed by the valve cools and depressurizes the product streams from the column **(See col. 8 lines 55-65)**. Therefore, a person having ordinary skill in the art at the time of invention would have found it obvious to provide for a cooling pipe/heat exchanger and a pressure reducing valve on the outlet of the column in Chervenak in order to depressurize and cool the product streams from the outlets.

Allowable Subject Matter

26. Claims 3-8, 24, 25, 27, and 28 are allowed.

27. The following is an examiner's statement of reasons for allowance: Allen is the nearest prior art to claims 3, 4 in that multiple outlets are provided for a fluidized bed reactor, and that the decomposition product is taken out of one of the outlets and that the distance through which the reactants flow in the reactor is adjusted.

28. However, with respect to claim 3, Allen does not teach nor does Allen fairly suggest that the steady flow flowing in an opposite direction to a direction in which the solid matter sinks or floats up and being slower than a sinking velocity or floating velocity of the solid matter, in which the solid matter is decomposed in the reactor. Instead in Allen the solid matter which forms in a steady flow in the fluidized bed is not a decomposable reactant but is particle physically resistant, and is not used up in the process (See Allen col. 4 lines 50-55), also the reactants which are decomposed in Allen pass through the reactor at high velocities (See Allen col. 3 lines 10-25).

29. And with respect to claim 4, Allen does not teach nor does Allen fairly suggest that the mixture containing solid matter introduced in the inlet is caused to flow in a steady state in an opposite direction to a direction in which the solid matter flows, the solid matter decomposing and the fine particles fluidizing. Instead in Allen the solid matter which forms in a steady flow in the fluidized bed is not a decomposable reactant but is particle physically resistant, and is not used up in the process (See Allen col. 4 lines 50-55), also the reactants which are decomposed in Allen pass through the reactor at high velocities (See Allen col. 3 lines 10-25).

Response to Arguments

30. Applicant's arguments filed 10-21-10 have been fully considered but they are not persuasive.

31. Applicant's arguments with respect to claims 1, 2, and 11 have been considered but are moot in view of the new ground(s) of rejection.

32. Applicant argues with respect to claim 12 that the fractionator of Chervenak is not capable of functioning as a reactor in which the introduced mixture of the material to be processed and the sub-critical water is caused to flow, in the sub-critical water in a steady state, in an opposite direction to a direction in which the solid matter travels. Applicant further alleges that the fractionator in Chervenak has trays which extend from opposite walls of the fractionator in an alternating manner to define a flow path which alternates back and forth, and that this would allegedly impede the ability of the mixture to be processed, and subcritical water to flow in a steady state. First, in response, apparatus claims cover what a device is, not what is does. See MPEP 2114. Also, in response, the examiner has carefully reviewed the Chervenak reference and a discussion of the alleged trays was not found.

33. Applicant then argues with respect to claim 15, that claim 15 provides a monitoring means through which the interior is visualized. Applicant argues that multiple temperature sensors as discussed in Kleiss only relates the temperature gradient being visualized and not the interior of the reactor. In response, a visualization of the temperature gradient within the reactor constitutes visualizing the interior of the reactor since the temperature conditions within the reactor would be visualized.

Conclusion

34. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucas Stelling whose telephone number is (571)270-3725. The examiner can normally be reached on Monday through Thursday 12:00PM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Las 12-31-10

/Matthew O Savage/
Primary Examiner, Art Unit 1776